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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/871,169	05/31/2001	Gary R. Gillingham	758.1234US01	7430

23552 7590 02/24/2003

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EXAMINER
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GREENE, JASON M

ART UNIT	PAPER NUMBER
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1724

DATE MAILED: 02/24/2003

12

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/871,169	GILLINGHAM ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Jason M. Greene	1724	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) \_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-99 is/are rejected.
- 7) ☒ Claim(s) 1,8,33,35-63 and 68-96 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____   |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4,5,9,10,12</u> . | 6) <input type="checkbox"/> Other:  |

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because pages 51-53 of the Specification have been written on in landscape orientation rather than in portrait orientation. See 37 CFR 1.52(a)(iii). Appropriate correction is required.

### ***Claim Objections***

2. Claims 35-63 and 68-96 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 35-63 are all directly or indirectly dependent on claim 33. However, while claim 33 is directed toward a method for filtering air in a gas turbine intake system, claims 35-63 are directed toward "The composition" of a previous claim. Claims 68-96 are all directly or indirectly dependent on claim 67. However, while claim 67 is directed toward a method for filtering air in a gas turbine intake system, claims 68-96 are directed toward "The composition" of a previous claim. Therefore, it is not clear whether or not the claims include all of the limitations of the previous claims from which they depend. For

examination purposes, all of the claims were assumed to include all of the limitations of the claims from which they depend.

3. Claim 1 is objected to because of the following informalities: The phrase "and construction" in line 5 should be deleted. Appropriate correction is required.

4. Claim 8 is objected to because of the following informalities: The word "composition should be inserted after the word "monomer" in line 3. Appropriate correction is required.

5. Claim 33 is objected to because of the following informalities: A period should be inserted at the end of line 13. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1, 33, and 67 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as

to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

While the Specification discloses a filter structure and method for filtering air entering a gas turbine intake system wherein the air has an ambient temperature of 100 °F to 300 °F and a relative humidity of 10 percent to 100 percent in page 3, lines 8-21, the disclosure does not disclose the turbine operating at a temperature of about 140 °F to 350 °F.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 3, 8, 16, 20, 39, 40, 47, 49, 51, 63, 65, 66, 72, 73, 80, 82, 84, 96, 98, and 99 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claim 3 is directed to a filter structure for filtering air in a gas turbine intake system. However, claim 3 also recites the method step of directing the air through the media pack of the filter element and into the open filter interior to clean the air. Since claim 3 is an apparatus claim, it is not clear how the method step recited in claim 3 would further define the apparatus recited in claim 3.

11. Claims 8, 39, 40, 72, and 73 recite the limitation "the nylon copolymer" in line 1.

There is insufficient antecedent basis for this limitation in the claims.

12. Claims 16, 47, 49, 80, and 82 recite the limitation "the resin" in line 1. There is insufficient antecedent basis for this limitation in the claim.

13. Claim 20, 51, and 84 recite the limitation "the resinous additive" in lines 1-2.

There is insufficient antecedent basis for this limitation in the claims.

14. Claim 63 recites the limitation "the polyarylate polymer" in line 1. There is insufficient antecedent basis for this limitation in the claim. It appears as though claim 63 should be dependent upon claim 62. For examination purposes, claim 63 has been assumed to depend upon claim 62.

15. Claims 65 and 98 recite the limitation "said step of directing air into an air intake of a gas turbine system having a plurality of filter element pairs" in lines 1-2. There is insufficient antecedent basis for this limitation in the claims. It appears as though claims 65 and 98 should be dependent upon claims 64 and 97, respectively. For examination purposes, claims 65 and 98 have been assumed to depend upon claims 64 and 97, respectively.

16. Claims 66 and 99 recite the limitation "the filter element pairs" in line 2. There is insufficient antecedent basis for this limitation in the claims.

17. Claim 96 recites the limitation "the polyarylate polymer" in line 1. There is insufficient antecedent basis for this limitation in the claim. It appears as though claim 96 should be dependent upon claim 95. For examination purposes, claim 96 has been assumed to depend upon claim 95.

***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claims 1-3, 7, 14-19, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399 in view of Klosek et al. and Gallucci '474.

With regard to claims 1, 3, and 7, Kahlbaugh et al. '399 discloses a filter structure for filtering air in a gas turbine intake system, the structure comprising at least one filter element (103), the filter element having a media pack (110) forming a tubular construction defining an open filter interior, the open filter interior being a clean air

plenum, the media pack including a pleated construction of a media composite, the media composite including a substrate (31) at least partially covered by a layer of fine fibers (32), the fine fibers comprising a polymeric composition comprising an addition polymer or a condensation polymer other than a copolymer formed from a cyclic lactam and a C<sub>6-10</sub> diamine monomer or a C<sub>6-10</sub> diacid monomer in Figs. 8-11, col. 1, lines 5-27, col. 14, line 35 to col. 17, line 28, and col. 25, line 5 to col. 27, line 32. Kahlbaugh et al. '399 discloses the fine fiber comprising the condensation polymers nylon and cellulose ether in col. 16, lines 53-64. Since Kahlbaugh et al. '399 teaches using nylons, aromatic nylons, or copolymers of nylons and aromatic nylons, Kahlbaugh et al. '399 is seen as teaching the polymer comprising a condensation polymer other than a copolymer formed from a cyclic lactam and a C<sub>6-10</sub> diamine monomer or a C<sub>6-10</sub> diacid monomer. Kahlbaugh et al. '399 discloses the fine fiber comprising the addition polymers polyvinyl chloride and polyvinylidene fluoride in col. 16, lines 53-64.

Kahlbaugh et al. '399 does not disclose the turbine operating at a temperature of 140 °F to 350 °F, the intake air having an ambient temperature and a humidity of at least 50 percent RH, or the polymeric composition comprising including an additive material comprising an oligomer having a molecular weight of 500 to 3000 and an aromatic character free of an alkyl moiety wherein the additive is miscible in the condensation polymer.

Gallucci '474 discloses forming fibers from a polymer comprising nylon and a resinous additive comprising a phenolic oligomer having a molecular weight of about



400 to 30000 and an aromatic character free of an alkyl moiety wherein the additive is miscible in the condensation polymer in col. 1, line 18 to col. 5, line 19.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the additive of Gallucci '474 into the nylon fibers of Kahlbaugh et al. '399 to improve the dimensionally stability of the fibers and to reduce the water absorption by the fibers, as suggested by Gallucci '474 in col. 1, line 29 to col. 2, line 41.

Since the prior art range is seen as overlapping the claimed range of the molecular weight being about 500 to 3000, a prima facie case of obviousness exists which must be overcome through a showing of unobvious or unexpected results.

Klosek et al. discloses operating a gas turbine wherein the intake air has an ambient temperature of 59 °F and a humidity of 60 percent RH in Fig. 1 and col. 2, lines 46-51.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the intake air conditions of Klosek et al. into the filter structure of Kahlbaugh et al. '399 to allow the gas turbine to be used in power generation, as suggested by Klosek et al. in col. 2, lines 46-51.

While Kahlbaugh et al. and Klosek et al. do not explicitly disclose the turbine operating at a temperature of 140 °F to 350 °F, one of ordinary skill in the art at the time the invention was made would have recognized that the gas turbine could be operated at any desired temperature up to the melting point of the metal used to fabricate the gas turbine.

Furthermore, intended use has been continuously held not to be germane to determining the patentability of the apparatus (In re Finsterwalder, 168 USPQ 530). Purpose to which apparatus is to be put and expression relating apparatus to contents thereof during intended operation are not significant in determining patentability of an apparatus claim (Ex parte Thibault, 164 USPQ 666). Inclusion of the material worked upon by the by a structure being claimed does not impart patentability to the claims (In re Otto et al., 136 USPQ 458). A recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the structural limitation of that claimed (Ex parte Masham, 2 USPQ 2d 1647).

With regard to claim 2, Kahlbaugh et al '399 discloses the substrate comprising a synthetic fiber in col. 15, line 37 to col. 16, line 19.

With regard to claims 14 and 15, Gallucci '474 teaches the additive comprising an oligomer comprising tertiary butyl phenol and having the claimed structure in col. 1, line 49 to col. 5, line 10. Gallucci '474 is seen as disclosing the claimed structure when R is a tertiary butyl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 16 and 17, Gallucci '474 teaches the additive comprising an oligomer comprising bis-phenol A and having the claimed structure in col. 1, line 49 to col. 5, line 10 and col. 7, lines 28-35. Gallucci '474 is seen as disclosing the claimed

structure when R is a alkyl hydroxy aryl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 18 and 19, Gallucci '474 teaches the additive comprising an oligomer comprising dihydroxy biphenyl and having the claimed structure in col. 1, line 49 to col. 5, line 10. Gallucci '474 is seen as disclosing the claimed structure when R is a hydroxy aryl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claim 27, Kahlbaugh et al. '399 discloses the condensation polymer comprising aromatic nylon in col. 18, lines 48-64.

20. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 as applied to claim 1 above, and further in view of Emig et al. and Baumann et al.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the polymer comprising a polyalkylene terephthalate.

Emig et al. teaches forming microfibers from copolymers of polyamides and polyesters in col. 2, lines 59-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the copolymer of polyamide and polyester of Emig et al. for the polymers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate polymers in the art for forming fine fibers, mere substitution of one known

fine fiber forming polymer for another in the art being within the scope of one having ordinary skill in the art.

Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Emig et al. do not disclose the polyester being a polyalkylene terephthalate.

Baumann et al. teaches polyethylene terephthalate being a well known polyester used in the formation of fine fibers in col. 5, lines 45-67.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the polyethylene terephthalate of Baumann et al. for the polyesters of Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Emig et al. in that such are alternate polyesters in the art for forming fine fibers, mere substitution of one known fine fiber forming polyester for another in the art being within the scope of one having ordinary skill in the art.

21. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 as applied to claim 1 above, and further in view of Asano et al.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the polymer comprising polyalkylene naphthalate.

Asano et al. teaches it being well known to form fibers from polyalkylene naphthalate in col. 1, lines 42-45.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the polyalkylene naphthalate of Asano et al. into the

fibers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 to improve the durability of the fiber, as suggested by Asano et al. in col. 1, lines 42-45.

22. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 as applied to claim 7 above, and further in view of Okamoto et al. '352.

With regard to claims 8-10, Kahlbaugh et al. '399 discloses the polymer being nylon, aromatic nylon, or a copolymer of nylon and aromatic nylon in col. 16, lines 48-64.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not explicitly disclose the nylon polymer being a copolymer combined with a second nylon polymer, the second nylon polymer differing in molecular weight or monomer composition, the second nylon polymer comprising an alkoxy alkyl modified polyamide, or the second nylon polymer comprising a nylon copolymer.

Okamoto et al. '352 discloses forming fibers from copolymers of nylon 6, nylon 7, nylon 8, nylon 9, nylon 11, and nylon 12 in col. 3, lines 58-67. Therefore, Okamoto et al. is seen as teaching forming fibers from a copolymer of nylon 6 and nylon 7, wherein the copolymer is combined with a second nylon copolymer comprising an alkoxy alkyl modified polyamide (nylon 8) and nylon 9.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the nylon copolymers of Okamoto et al. '352 for the

nylons of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate nylons in the art for forming fibers, mere substitution of one known fiber forming nylon for another in the art being within the scope of one having ordinary skill in the art.

With regard to claim 11, Okamoto et al. '352 teaches the nylons being combined to form a copolymer in col. 3, lines 58-67.

Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Okamoto et al. '352 do not explicitly disclose the polymers being treated to from a single polymeric composition as measured by a differential scanning calorimeter showing a single phase material.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to ensure that the different polymers were sufficiently well mixed to form a single phase continuous copolymer material to ensure that the formed fibers exhibited the desired properties across the entire length and cross-section of the fibers.

23. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Okamoto et al. '352 as applied to claim 11 above, and further in view of Ueda et al. '055

With regard to claim 12, Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Okamoto et al. '352 do not disclose the copolymer and the second polymer being heat treated.

Ueda et al. '055 discloses heat treating nylon fibers in col. 1, lines 23-26.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the heat treatment of Ueda et al. '055 into the fibers of Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Okamoto et al. '352 to stabilize the fibers against heat and stress, as suggested by Ueda et al. in col. 1, lines 23-26.

With regard to claim 13, Ueda et al. discloses heat treating the nylon to a temperature (180 °C) less than the lower melting point of the polymers in col. 2, lines 37-51.

24. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claim 1 above and further in view of Jariwala et al.

Kahlbaugh et al. '399, Klosek et al., Gallucci '474 do not disclose the additive comprising a blend of the resinous additive and a fluoropolymer.

Jariwala et al. discloses adding a nonionic fluorocarbon surfactant to a polymeric fiber in col. 1, line 4 to col. 4, line 64 and col. 11, line 39 to col. 12, line 27.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the fluoropolymer of Jariwala et al. into the fiber of Kahlbaugh et al. '399, Klosek et al., Gallucci '474 to provide oil and water repellency to the fibers, as suggested by Jariwala et al. in col. 12, lines 7-27.

25. Claims 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claim 1 above and further in view of Emig et al.

With regard to claims 23 and 24, Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the condensation polymer comprising a polyurethane polymer or a blend of a polyurethane polymer and a polyamide polymer.

Emig et al. teaches forming microfibers from polyurethane and a blend of polyurethane and polyamide in col. 2, lines 59-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the polyurethane and blend of polyurethane and polyamide of Emig et al. for the polymers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate polymers in the art for forming fine fibers, mere substitution of one known fine fiber forming polymer for another in the art being within the scope of one having ordinary skill in the art.

With regard to claims 25 and 26, Kahlbaugh et al. '399 discloses the polyamide polymer comprising a nylon homopolymer or a copolymer of nylon and aromatic nylon in col. 16, lines 56-64.



26. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 as applied to claim 1 above and further in view of Idemura et al.

Kahlbaugh et al. discloses the condensation polymer comprising an aromatic polyamide in col. 16, lines 56-64.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the condensation polymer being a reaction product of a diamine monomer and poly(m-phenylene isophthalamide).

Idemura et al. discloses forming fibers from an aromatic polyamide formed as a reaction product of a diamine monomer and poly(m-phenylene isophthalamide) in col. 7, lines 11-24.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the aromatic polyamide formed as a reaction product of a diamine monomer and poly(m-phenylene isophthalamide) of Idemura et al. into the fibers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 to produce fibers having a very high heat resistance, as suggested by Idemura et al. in col. 7, lines 11-24.

27. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Idemura as applied to claim 28 above and further in view of Muto et al.

Kahlbaugh et al. discloses the condensation polymer comprising an aromatic polyamide in col. 16, lines 56-64.

Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Idemura do not disclose the condensation polymer being a reaction product of a diamine monomer and poly(p-phenylene terephthalamide).

Muto et al. discloses forming fibers from an aromatic polyamide formed as a reaction product of a diamine monomer and poly(p-phenylene terephthalamide) in col. 7, lines 11-24.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the aromatic polyamide formed as a reaction product of a diamine monomer and poly(p-phenylene terephthalamide) of Muto et al. for the aromatic polyamides of Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Idemura in that such are alternate aromatic polyamides in the art for forming fibers, mere substitution of one known fiber forming aromatic polyamide for another in the art without a showing of unobvious or unexpected results being within the scope of one having ordinary skill in the art.

28. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claim 1 above and further in view of Dzenis et al.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the condensation polymer comprising polybenzimidazole.

Dzenis et al. discloses forming fine fibers from polybenzimidazole in col. 12, lines 36-38.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the polybenzimidazole of Dzenis et al. for the condensation polymers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate polymers in the art for forming fibers, mere substitution of one known fine fiber forming polymer for another in the art without a showing of unobvious or unexpected results being within the scope of one having ordinary skill in the art.

29. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claim 1 above and further in view of Ueda et al. '376.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the condensation polymer comprising a polyarylate.

Ueda et al. discloses forming fibers from polyarylate in col. 12, lines 36-38.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the polyarylate of Ueda et al. '376 for the condensation polymers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate polymers in the art for forming fibers, mere substitution of one known fine fiber forming polymer for another in the art without a showing of unobvious or unexpected results being within the scope of one having ordinary skill in the art.

30. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Ueda et al. '376 as applied to claim 43 above and further in view of Okamoto et al. '707

Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Ueda et al. '376 do not disclose the polyarylate polymer comprising a condensation polymerization reaction product between bis-phenol-A and mixed phthalic acids.

Okamoto et al. '707 discloses forming a polyarylate polymer as a reaction product between bis-phenol-A and mixed phthalic acids in col. 1, lines 34-38.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the polyarylate of Okamoto et al. '352 into the fiber of Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Ueda et al. '376 to provide a fiber having excellent heat resistance, as suggested by Okamoto et al. in col. 1, lines 34-38.

31. Claims 33, 34, 38, 45-50, 58, 66, 67, 78-83, 91, and 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399 in view of Klosek et al. and Gallucci '474.

With regard to claims 33, 34, 38, and 67, Kahlbaugh et al. '399 discloses a method for filtering air in a gas turbine intake system, the method comprising the steps of installing a filter proximate an air intake of a gas turbine system, the filter comprising at least one filter element (103), the filter element having a media pack (110) forming a tubular construction defining an open filter interior, the open filter interior being a clean

air plenum, the media pack including a pleated construction of a media composite, the media composite including a substrate (31) at least partially covered by a layer of fine fibers (32), the fine fibers comprising a polymeric composition comprising an addition polymer or a condensation polymer other than a copolymer formed from a cyclic lactam and a C<sub>6-10</sub> diamine monomer or a C<sub>6-10</sub> diacid monomer, directing intake air into an air intake of a gas turbine, and directing the air through the media pack of the filter element and into the open filter interior to clean the air. Kahlbaugh et al. '399 discloses the fine fiber comprising the condensation polymers nylon and cellulose ether in col. 16, lines 53-64. Since Kahlbaugh et al. '399 teaches using nylons, aromatic nylons, or copolymers of nylons and aromatic nylons, Kahlbaugh et al. '399 is seen as teaching the polymer comprising a condensation polymer other than a copolymer formed from a cyclic lactam and a C<sub>6-10</sub> diamine monomer or a C<sub>6-10</sub> diacid monomer. Kahlbaugh et al. '399 discloses the fine fiber comprising the addition polymers polyvinyl chloride and polyvinylidene fluoride in col. 16, lines 53-64.

Kahlbaugh et al. '399 does not disclose the turbine operating at a temperature of 140 °F to 350 °F, the intake air having an ambient temperature and a humidity of at least 50 percent RH, or the polymeric composition comprising including an additive material comprising an oligomer having a molecular weight of 500 to 3000 and an aromatic character free of an alkyl moiety wherein the additive is miscible in the condensation polymer.

Gallucci '474 discloses forming fibers from a polymer comprising nylon and a resinous additive comprising a phenolic oligomer having a molecular weight of about

400 to 30000 and an aromatic character free of an alkyl moiety wherein the additive is miscible in the condensation polymer in col. 1, line 18 to col. 5, line 19.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the incorporate the additive of Gallucci '474 into the nylon fibers of Kahlbaugh et al. '399 to improve the dimensionally stability of the fibers and to reduce the water absorption by the fibers, as suggested by Gallucci '474 in col. 1, line 29 to col. 2, line 41.

Since the prior art range is seen as overlapping the claimed range of the molecular weight being about 500 to 3000, a prima facie case of obviousness exists which must be overcome through a showing of unobvious or unexpected results.

Klosek et al. discloses operating a gas turbine wherein the intake air has an ambient temperature of 59 °F and a humidity of 60 percent RH in Fig. 1 and col. 2, lines 46-51.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the intake air conditions of Klosek et al. into the filter structure of Kahlbaugh et al. '399 to allow the gas turbine to be used in power generation, as suggested by Klosek et al. in col. 2, lines 46-51.

While Kahlbaugh et al. and Klosek et al. do not explicitly disclose the turbine operating at a temperature of 140 °F to 350 °F, one of ordinary skill in the art at the time the invention was made would have recognized that the gas turbine could be operated at any desired temperature up to the melting point of the metal used to fabricate the gas turbine.

With regard to claims 45, 46, 78, and 79, Gallucci '474 teaches the additive comprising an oligomer comprising tertiary butyl phenol and having the claimed structure in col. 1, line 49 to col. 5, line 10. Gallucci '474 is seen as disclosing the claimed structure when R is a tertiary butyl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 47, 48, 80, and 81, Gallucci '474 teaches the additive comprising an oligomer comprising bis-phenol A and having the claimed structure in col. 1, line 49 to col. 5, line 10 and col. 7, lines 28-35. Gallucci '474 is seen as disclosing the claimed structure when R is a alkyl hydroxy aryl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 49, 50, 82, and 83, Gallucci '474 teaches the additive comprising an oligomer comprising dihydroxy biphenyl and having the claimed structure in col. 1, line 49 to col. 5, line 10. Gallucci '474 is seen as disclosing the claimed structure when R is a hydroxy aryl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 58 and 91, Kahlbaugh et al. '399 discloses the condensation polymer comprising aromatic nylon in col. 18, lines 48-64.

With regard to claims 66 and 99, Kahlbaugh et al. '399 discloses the method further including directing a pulse of air into each of the clean air plenums of each of the filter element pairs to at least partially remove particulates collected on each of the media packs in col. 11, lines 30-46.

32. Claims 35, 37, 68, and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 as applied to claims 33 and 67 above, and further in view of Emig et al. and Baumann et al.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the polymer comprising a polyalkylene terephthalate.

Emig et al. teaches forming microfibers from copolymers of polyamides and polyesters in col. 2, lines 59-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the copolymer of polyamide and polyester of Emig et al. for the polymers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate polymers in the art for forming fine fibers, mere substitution of one known fine fiber forming polymer for another in the art being within the scope of one having ordinary skill in the art.

Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Emig et al. do not disclose the polyester being a polyalkylene terephthalate.

Baumann et al. teaches polyethylene terephthalate being a well known polyester used in the formation of fine fibers in col. 5, lines 45-67.



It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the polyethylene terephthalate of Baumann et al. for the polyesters of Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Emig et al. in that such are alternate polyesters in the art for forming fine fibers, mere substitution of one known fine fiber forming polyester for another in the art being within the scope of one having ordinary skill in the art.

33. Claims 36 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 as applied to claims 33 and 67 above, and further in view of Asano et al.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the polymer comprising polyalkylene naphthalate.

Asano et al. teaches it being well known to form fibers from polyalkylene naphthalate in col. 1, lines 42-45.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the polyalkylene naphthalate of Asano et al. into the fibers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 to improve the durability of the fiber, as suggested by Asano et al. in col. 1, lines 42-45.

34. Claims 39-42 and 72-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 as applied to claims 33 and 67 above, and further in view of Okamoto et al. '352.

With regard to claims 39-41 and 72-74, Kahlbaugh et al. '399 discloses the polymer being nylon, aromatic nylon, or a copolymer of nylon and aromatic nylon in col. 16, lines 48-64.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not explicitly disclose the nylon polymer being a copolymer combined with a second nylon polymer, the second nylon polymer differing in molecular weight or monomer composition, the second nylon polymer comprising an alkoxy alkyl modified polyamide, or the second nylon polymer comprising a nylon copolymer.

Okamoto et al. '352 discloses forming fibers from copolymers of nylon 6, nylon 7, nylon 8, nylon 9, nylon 11, and nylon 12 in col. 3, lines 58-67. Therefore, Okamoto et al. is seen as teaching forming fibers from a copolymer of nylon 6 and nylon 7, wherein the copolymer is combined with a second nylon copolymer comprising an alkoxy alkyl modified polyamide (nylon 8) and nylon 9.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the nylon copolymers of Okamoto et al. '352 for the nylons of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate nylons in the art for forming fibers, mere substitution of one known fiber forming nylon for another in the art being within the scope of one having ordinary skill in the art.

With regard to claims 42 and 75, Okamoto et al. '352 teaches the nylons being combined to form a copolymer in col. 3, lines 58-67.

Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Okamoto et al. '352 do not explicitly disclose the polymers being treated to from a single polymeric composition as measured by a differential scanning calorimeter showing a single phase material.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to ensure that the different polymers were sufficiently well mixed to form a single phase continuous copolymer material to ensure that the formed fibers exhibited the desired properties across the entire length and cross-section of the fibers.

35. Claims 43, 44, 76, and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Okamoto et al. '352 as applied to claims 42 and 74 above, and further in view of Ueda et al. '055

With regard to claims 43 and 76, Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Okamoto et al. '352 do not disclose the copolymer and the second polymer being heat treated.

Ueda et al. '055 discloses heat treating nylon fibers in col. 1, lines 23-26.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the heat treatment of Ueda et al. '055 into the fibers of Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Okamoto et al. '352 to stabilize the fibers against heat and stress, as suggested by Ueda et al. in col. 1, lines 23-26.

With regard to claims 44 and 77, Ueda et al. discloses heat treating the nylon to a temperature ( $180^{\circ}\text{C}$ ) less than the lower melting point of the polymers in col. 2, lines 37-51.

36. Claims 51-53 and 84-86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claims 33 and 67 above and further in view of Jariwala et al.

Kahlbaugh et al. '399, Klosek et al., Gallucci '474 do not disclose the additive comprising a blend of the resinous additive and a fluoropolymer.

Jariwala et al. discloses adding a nonionic fluorocarbon surfactant to a polymeric fiber in col. 1, line 4 to col. 4, line 64 and col. 11, line 39 to col. 12, line 27.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the fluoropolymer of Jariwala et al. into the fiber of Kahlbaugh et al. '399, Klosek et al., Gallucci '474 to provide oil and water repellency to the fibers, as suggested by Jariwala et al. in col. 12, lines 7-27.

37. Claims 54-57 and 87-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claims 33 and 67 above and further in view of Emig et al.

With regard to claims 54, 55, 87, and 88, Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the condensation polymer comprising a polyurethane polymer or a blend of a polyurethane polymer and a polyamide polymer.

Emig et al. teaches forming microfibers from polyurethane and a blend of polyurethane and polyamide in col. 2, lines 59-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the polyurethane and blend of polyurethane and polyamide of Emig et al. for the polymers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate polymers in the art for forming fine fibers, mere substitution of one known fine fiber forming polymer for another in the art being within the scope of one having ordinary skill in the art.

With regard to claims 56, 57, 89, and 90, Kahlbaugh et al. '399 discloses the polyamide polymer comprising a nylon homopolymer or a copolymer of nylon and aromatic nylon in col. 16, lines 56-64.

38. Claims 59 and 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 as applied to claims 33 and 67 above and further in view of Idemura et al.

Kahlbaugh et al. discloses the condensation polymer comprising an aromatic polyamide in col. 16, lines 56-64.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the condensation polymer being a reaction product of a diamine monomer and poly(m-phenylene isophthalamide).

Idemura et al. discloses forming fibers from an aromatic polyamide formed as a reaction product of a diamine monomer and poly(m-phenylene isophthalamide) in col. 7, lines 11-24.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the aromatic polyamide formed as a reaction product of a diamine monomer and poly(m-phenylene isophthalamide) of Idemura et al. into the fibers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 to produce fibers having a very high heat resistance, as suggested by Idemura et al. in col. 7, lines 11-24.

39. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claims 58 above and further in view of Muto et al.

Kahlbaugh et al. discloses the condensation polymer comprising an aromatic polyamide in col. 16, lines 56-64.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, do not disclose the condensation polymer being a reaction product of a diamine monomer and poly(p-phenylene terephthalamide).

Muto et al. discloses forming fibers from an aromatic polyamide formed as a reaction product of a diamine monomer and poly(p-phenylene terephthalamide) in col. 7, lines 11-24.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the aromatic polyamide formed as a reaction product of a diamine monomer and poly(p-phenylene terephthalamide) of Muto et al. for the aromatic polyamides of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, in that such are alternate aromatic polyamides in the art for forming fibers, mere substitution of one known fiber forming aromatic polyamide for another in the art without a showing of unobvious or unexpected results being within the scope of one having ordinary skill in the art.

40. Claims 61 and 94 rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claims 33 and 67 above and further in view of Dzenis et al.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the condensation polymer comprising polybenzimidazole.

Dzenis et al. discloses forming fine fibers from polybenzimidazole in col. 12, lines 36-38.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the polybenzimidazole of Dzenis et al. for the condensation polymers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that

such are alternate polymers in the art for forming fibers, mere substitution of one known fine fiber forming polymer for another in the art without a showing of unobvious or unexpected results being within the scope of one having ordinary skill in the art.

41. Claims 62 and 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claims 33 and 67 above and further in view of Ueda et al. '376.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the condensation polymer comprising a polyarylate.

Ueda et al. discloses forming fibers from polyarylate in col. 12, lines 36-38.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the polyarylate of Ueda et al. '376 for the condensation polymers of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate polymers in the art for forming fibers, mere substitution of one known fine fiber forming polymer for another in the art without a showing of unobvious or unexpected results being within the scope of one having ordinary skill in the art.

42. Claims 63 and 96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Ueda et al. '376 as applied to claims 62 and 95 above and further in view of Okamoto et al. '707



Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Ueda et al. '376 do not disclose the polyarylate polymer comprising a condensation polymerization reaction product between bis-phenol-A and mixed phthalic acids.

Okamoto et al. '707 discloses forming a polyarylate polymer as a reaction product between bis-phenol-A and mixed phthalic acids in col. 1, lines 34-38.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the polyarylate of Okamoto et al. '352 into the fiber of Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Ueda et al. '376 to provide a fiber having excellent heat resistance, as suggested by Okamoto et al. in col. 1, lines 34-38.

43. Claims 64, 65, 97, and 98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claims 33 and 67 above and further in view of Raether.

With regard to claims 64 and 97, Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not disclose the step of directing air into an air intake of a gas turbine system having at least one filter element including directing air into an air intake of a gas turbine system having a plurality of filter element pairs, each of the filter element pairs including a first tubular filter element with the media pack sealed against an end of a second tubular filter element with the media pack, each of the first and second tubular filter elements defining the clean air plenum.

Raether discloses a similar method including the step of directing air into an air intake of a gas turbine system having at least one filter element (32) including directing air into an air intake of a gas turbine system having a plurality of filter element pairs, each of the filter element pairs including a first tubular filter element (32) with a media pack sealed against an end of a second tubular filter element (32) with a media pack, each of the first and second tubular filter elements defining a clean air plenum in Fig. 2 and col. 4, line 1 to col. 5, line 47.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the filter element pairs of Raether into the method of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 to provide a filter system having a number of shorter filter elements to allow the shorter filter elements to be individually replaced when damaged to reduce maintenance costs.

With regard to claims 65 and 98, Raether discloses the step of directing air into an air intake of a gas turbine system having a plurality of filter element pairs including directing air into the first tubular filter element and the second tubular filter element, wherein the first and second tubular filter elements are cylindrical in Fig. 2 and col. 4, line 1 to col. 5, line 47.

Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Raether do not disclose the first tubular filter element being cylindrical and the second tubular filter element being conical.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to change the shape of the second tubular filter element of Raether in that such is merely a choice of design. See *In re Dailey et al.*, 149 USPQ 47.

44. Claim 71 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., and Gallucci '474, as applied to claim 67 above and further in view of Baumann et al.

Kahlbaugh et al. '399 discloses the polymer being nylon in col. 16, lines 48-64.

Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 do not explicitly disclose the nylon polymer comprising a homopolymer having repeating units derived from a cyclic lactam.

Baumann et al. teaches forming fine fibers from a nylon polymer, wherein the polymer comprising a homopolymer (nylon 6) having repeating units derived from a cyclic lactam in col. 5, lines 45-67.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the nylon 6 of Baumann et al. for the nylons of Kahlbaugh et al. '399, Klosek et al., and Gallucci '474 in that such are alternate nylons in the art for forming fine fibers, mere substitution of one known fine fiber forming nylon for another in the art being within the scope of one having ordinary skill in the art.

45. Claim 93 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Idemura as applied to claim 92 above and further in view of Muto et al.

Kahlbaugh et al. discloses the condensation polymer comprising an aromatic polyamide in col. 16, lines 56-64.

Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Idemura do not disclose the condensation polymer being a reaction product of a diamine monomer and poly(p-phenylene terephthalamide).

Muto et al. discloses forming fibers from an aromatic polyamide formed as a reaction product of a diamine monomer and poly(p-phenylene terephthalamide) in col. 7, lines 11-24.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the aromatic polyamide formed as a reaction product of a diamine monomer and poly(p-phenylene terephthalamide) of Muto et al. for the aromatic polyamides of Kahlbaugh et al. '399, Klosek et al., Gallucci '474, and Idemura in that such are alternate aromatic polyamides in the art for forming fibers, mere substitution of one known fiber forming aromatic polyamide for another in the art without a showing of unobvious or unexpected results being within the scope of one having ordinary skill in the art.

46. Claims 1-3, 7-11, 14-19, 25-27, 33, 34, 38-42, 45-50, 58, 67, 71-75, 78-83, 91, and 93 are rejected under 35 U.S.C. 103(a) as obvious over the public use or sale of the invention in view of Gallucci '474.

Under 35 U.S.C. §102(b), "[a] person shall be entitled to a patent unless ...the invention was in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States ...." 35 U.S.C. §102(b) (2000). Whether a patent is invalid for a public use or sale is a question of law based on underlying facts. A conclusion that a section 102(b) bar precludes a patent application from issuing must be based on substantial evidence. Section 102(b) may bar patentability by anticipation if the device used in public includes every limitation of the later claimed invention, or by obviousness if the differences between the claimed invention and the device used would have been obvious to one of ordinary skill in the art.

Public use includes any use of [the claimed] invention by a person other than the inventor who is under no limitation, restriction or obligation of secrecy to the inventor. The public use bar serves the policies of the patent system, for it encourages prompt filing of patent applications after inventions have been completed and publicly used, and sets an outer limit to the term of exclusivity. *Allied Colloids v. Am. Cyanamid Co.*, 64 F.3d 1570, 1574, 35 USPQ2d 1840, 1842 (Fed. Cir. 1995).

In this case, there is evidence that the invention was "completed" before the P19-1280 and P19-1281 filters were shipped to assignee's customers in the late spring of 1999, i.e., Solar Turbines, GE Elwood, GE Belle River, and the customers in Saudi Arabia and Santiago, Chile. Specifically, the production run noted at paragraph 10 of the Supplemental Crofoot declaration evidences that the filters were "completed" prior to their shipment to the customers.

Testing of a new product under development at the potential customer's site does not raise a public use bar as a matter of law. All of the circumstances must be considered, to ascertain whether on the entirety of the evidence it has been proved that the invention was publicly used.

The law recognizes that an inventor may test his invention in public without incurring the public use bar. Experimental use negates public use; when proved, it may show that particular acts, even if apparently public in a colloquial sense, do not constitute a public use within the meaning of section 102. TP Labs., Inc. v. Prof'l Positioners, Inc., 724 F.2d 965, 220 USPQ 577 (Fed. Cir. 1984)). "The use of an invention by the inventor himself, or of any other person under his direction, by way of experiment, and in order to bring the invention to perfection, has never been regarded as such a use." *City of Elizabeth v. Am. Nicholson Pavement Co.*, 97 U.S. 126, 134 (1877). In this case, there is no evidence that the various customers to whom the filters were shipped in the spring of 1999 were acting under the direction of the inventors.

They were not even aware that a so-called experiment was underway. See the Supplemental Crofoot Declaration at paragraph 17. There is no evidence of any oral or written confidentiality agreement between assignee and each of GE Belle River, GE Elwood, Solar Turbines, or the Saudi and Chilean customers.

The totality of the circumstances are reviewed when evaluating whether there has been a public use within the meaning of section 102(b). The totality of the circumstances is considered in conjunction with the policies underlying the public use bar. The circumstances may include: the nature of the activity that occurred in public; the public access to and knowledge of the public use; whether there was any confidentiality obligation imposed on persons who observed the use; whether persons other than the inventor performed the testing; the number of tests; the length of the test period in relation to tests of similar devices; and whether the inventor received payment for the testing. See *Allied Colloids*, 64 F.3d at 1574, 35 USPQ2d at 1842; *Baker Oil Tools, Inc. v. Geo Vann, Inc.*, 828 F.2d 1558, 1564, 4 USPQ2d 1210, 1214 (Fed. Cir. 1987); *In re Brigance*, 792 F.2d 1103, 1107-08, 229 USPQ 988, 991 (Fed. Cir. 1986); *Hycor Corp. v. Schlueter Co.*, 740 F.2d 1529, 1535, 222 USPQ 553, 557 (Fed. Cir. 1984); *TP Labs., Inc.*, 724 F.2d at 971-72, 220 USPQ at 582. There may be additional factors in a particular case relevant to the public nature of the use or any asserted experimental aspect.

In this case, the nature of the activity that occurred in public appears to be no different than the public use to which the prior art filters were put: Filtering of air admitted to turbines. There is no evidence that any of the customers believed they were under a confidentiality obligation imposed on the customers who observed the various uses. There is no evidence applicants made any discernable effort to inform the 1999 customers of any requirement of confidentiality, or otherwise indicate to them that they would owe them a duty of confidentiality. As noted above, the customers did not even know that a so-called experiment was underway. In this case, persons other than the inventors performed the testing. Finally, in this case the inventor received payment for the testing. All of these factors point to an ordinary commercial use rather than to an experimental use.

To establish that an otherwise public use does not run afoul of section 102(b), it must be shown that the activity was substantially for purposes of experiment. Applicants in their Crofoot Declaration and Supplemental Declaration presented no objective evidence to support experimental use. The experimental use negation is unavailable to a patentee when the evidence presented does not establish that he was conducting a bona fide experiment. *TP Labs., Inc.*, 724 F.2d at 969, 220 USPQ at 580. Furthermore, Applicants presented no objective evidence that they maintained any records of testing the filters. This failure weighs against them. *Allied Colloids*, 64 F.3d at 1576, 35 USPQ2d at 1844; *TP Labs., Inc.*, 724 F.2d at 972-73, 220 USPQ at 583) (recognizing



that whether records were kept of progress may indicate that an inventor was testing the device, not the market).

Preparation of detailed records of the so-called "experimental" uses of the invention at the customer's plants is highly relevant for the keeping of detailed test records is a routine indicium of the experimental mode. As in TP Labs., such facts "indicate the inventor was testing the device, not the market." 724 F.2d at 973, 220 USPQ at 583. In this case, there is no evidence whatsoever of any records of the performance of the filters in the customers' plants.

Applicants do not even argue that at all relevant times they took affirmative steps to maintain control of the invention. Here, Crofoot contends that applicants were alerted to the return of some filters, but there is no evidence that applicants required the customers to return the spent filters for forensic examination of their condition, nor did applicants indicate that the customers were required or even requested to provide feedback on the performance of the "new" filters. While there is some evidence that the customers closely monitored the performance of the filters, there was no indication that applicants inquired of those results, or required that data of their customers. As in Netscape Communications Corp. v. Konrad, 63 USPQ2d 1580 (Fed. Cir. 2002), applicants sold the filters "and let people try it out." There is no indication that applicants ever monitored the operating parameters of the turbine systems in which the new filters were used.

The law recognizes an inventor's need to test the invention, to ascertain whether the work is complete or further changes should be made, and to show that the invention will work for its intended purpose. . . . [S]uch testing and development may encompass or even require disclosure to the public, without barring the inventor's access to the patent system. Furthermore, if testing had to be run in customer's plant, even subsequent commercial success does not convert the test activity into an invalidating public use. The dispositive consideration is whether *the inventor* was in fact testing the invention. It is not necessary that the machine should be put up and used only in the inventor's own shop or premises. He may have it put up and used in the premises of another, and the use may inure to the benefit of the owner of the establishment. But for such a use by a customer to qualify as an "experimental use," the use must be under the surveillance of the inventor, and for the purpose of enabling him to test the product, and to ascertain whether it will answer the purpose intended, and make such alterations and improvements as experience demonstrates to be necessary. In this case, there is no evidence that the use was under the surveillance of the inventor. In this case, there is no evidence that the use by the customers was for the purpose of enabling the inventors to test the product. In this case, there is no evidence that the various uses were designed to answer whether the product would satisfy the purpose intended.

Declarant Crofoot stated the problem in the prior art was deterioration of the fine fibers made of the "old polymer" under combined conditions of high temperature (>25 °C) and high relative humidity (>70% relative humidity). However the locations selected

to conduct the testing do not satisfy this requirement. Namely, the locations selected to conduct the testing are not hot and humid. Since the shipments were made in May, it can be assumed that the filters were installed during the months of June through August, as one would expect the filters to be installed within three months of shipment. While Saudi Arabia is hot during these months, it is not humid, as evidenced by the fact that a vast majority of Saudi Arabia is desert. Similarly, Santiago, Chile is not hot in the months of June through August as this is the winter season in the Southern Hemisphere.

Applicants' failure to monitor the use of the new filters and failure to impose confidentiality agreements on those that used it was enough to place the claimed features of the patent applications in the public's possession.

The on-sale bar applies when the invention is the subject of a commercial offer for sale, and is ready for patenting before the critical date. Pfaff v. Wells Electronics, Inc., 525 U.S. 55, 48 USPQ2d 1641 (1998). The ready for patenting condition "may be satisfied in at least two ways: by proof of reduction to practice before the critical date; or by proof that prior to the critical date the inventor had prepared drawings or other descriptions of the invention that were sufficiently specific to enable a person skilled in the art to practice the invention." *Id.* at 67-68. In this case, there is evidence that the claimed invention, or an obvious variation thereof, was reduced to

practice because the new filters including the new polymer were manufactured and shipped to customers in the spring of 1999.

When the asserted basis of rejection is the on-sale bar, the examiner should determine whether the subject of the barring activity met each of the limitations of the claim. The various shipments of the filters in the spring of 1999 made in response to the various purchase orders from the various customers placed with the assignee of the invention clearly evidence “sales” of the filters made with the “new polymer” before the critical date of 05 September 1999. These sales were not incidental to an otherwise experimental use, so they evidence that the filters were “on-sale” within the meaning of §102(b).

The purchase orders submitted by the customers, i.e., Solar Turbines, GE Belle River, GE Elwood, the Saudi Arabia facility, and the Santiago, Chile facility were offers to buy the P19-1280 and P19-1281 filters. The purchase orders presumably contained sufficiently definite terms to create an enforceable contract upon acceptance under the UCC. It is unclear if they identified the requested product by specifically referring to the P19-1280 and P19-1281 product numbers. Be that as it may, the fact is that the assignees shipped the P19-1280 and P19-1281 products including the “new polymer” in response to these purchase orders. Filling of the orders with shipped product evidences a sale.

The absence of payment supports the inference that the tests were for the benefit of the applicant, and thus contravenes the inference of public use for or by the potential customer. However, unlike the Applied Colloids case, Assignee received payment from the customers for the filters shipped.

With regard to claims 1, 3, 7-11, and 25-27, the P19-1280 and P19-1281 filters, as in public use and offered for sell prior to the critical date of 05 September 1999, comprise a filter structure for filtering air in a gas turbine intake system, the turbine operating at a temperature of about 140<sup>0</sup>F to 350<sup>0</sup>F, the air intake having an ambient temperature and a humidity of at least 50% RH, the structure comprising at least one filter element, the filter element having a media pack (1) forming a tubular construction defining an open filter interior, the open filter interior being a clean air plenum, the media pack including a pleated construction of a media composite, the media composite including a substrate at least partially covered by a layer of fine fibers, the fine fibers comprising a nylon blend of about 70 weight percent alkoxy alkyl modified nylon 66 and 30 weight percent of a blend consisting of 50 weight percent nylon 6, 25 weight percent nylon 66, and 25 weight percent nylon 6.10. See Crofoot Declaration at paragraphs 4, 5, and 13.

The P19-1280 and P19-1281 filters do not include the fine fibers being formed from a polymer comprising nylon and a resinous additive comprising a phenolic oligomer having a molecular weight of about 400 to 30000 and an aromatic character free of an alkyl moiety wherein the additive is miscible in the condensation polymer.

Gallucci '474 discloses forming fibers from a polymer comprising nylon and a resinous additive comprising a phenolic oligomer having a molecular weight of about 400 to 30000 and an aromatic character free of an alkyl moiety wherein the additive is miscible in the condensation polymer in col. 1, line 18 to col. 5, line 19.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the additive of Gallucci '474 into the nylon fibers of the P19-1280 and P19-1281 filters to improve the dimensionally stability of the fibers and to reduce the water absorption by the fibers, as suggested by Gallucci '474 in col. 1, line 29 to col. 2, line 41.

Since the prior art range is seen as overlapping the claimed range of the molecular weight being about 500 to 3000, a prima facie case of obviousness exists which must be overcome through a showing of unobvious or unexpected results.

With regard to claim 2, the P19-1280 and P19-1281 filters are disclosed as having a substrate formed of a synthetic/cellulose fiber blend in paragraph 5 of the Crofoot Declaration.

With regard to claims 14 and 15, Gallucci '474 teaches the additive comprising an oligomer comprising tertiary butyl phenol and having the claimed structure in col. 1, line 49 to col. 5, line 10. Gallucci '474 is seen as disclosing the claimed structure when R is a tertiary butyl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 16 and 17, Gallucci '474 teaches the additive comprising an oligomer comprising bis-phenol A and having the claimed structure in col. 1, line 49 to col. 5, line 10 and col. 7, lines 28-35. Gallucci '474 is seen as disclosing the claimed structure when R is a alkyl hydroxy aryl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 18 and 19, Gallucci '474 teaches the additive comprising an oligomer comprising dihydroxy biphenyl and having the claimed structure in col. 1, line 49 to col. 5, line 10. Gallucci '474 is seen as disclosing the claimed structure when R is a hydroxy aryl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 33, 34, 38-42, 58, 67, 71-75, 91, and 93 the P19-1280 and P19-1281 filters, as in public use and offered for sell prior to the critical date of 05 September 1999, are disclosed as being used in a method for filtering air in a gas turbine intake system, the turbine operating at a temperature of about 140<sup>0</sup>F to 350<sup>0</sup>F, the air intake having an ambient temperature and a humidity of at least 50% RH, the method comprising the steps of installing a filter proximate an air intake of a gas turbine system, the filter comprising at least one filter element, the filter element having a media pack (1) forming a tubular construction defining an open filter interior, the open filter interior being a clean air plenum, the media pack including a pleated construction of a media composite, the media composite including a substrate at least partially covered by a layer of fine fibers, the fine fibers comprising a nylon blend of about 70 weight

percent alkoxy alkyl modified nylon 66 and 30 weight percent of a blend consisting of 50 weight percent nylon 6, 25 weight percent nylon 66, and 25 weight percent nylon 6.10See Crofoot Declaration at paragraphs 4, 5, and 13.

The P19-1280 and P19-1281 filters do not include the polymeric composition comprising including an additive material comprising an oligomer having a molecular weight of 500 to 3000 and an aromatic character free of an alkyl moiety wherein the additive is miscible in the condensation polymer.

Gallucci '474 discloses forming fibers from a polymer comprising nylon and a resinous additive comprising a phenolic oligomer having a molecular weight of about 400 to 30000 and an aromatic character free of an alkyl moiety wherein the additive is miscible in the condensation polymer in col. 1, line 18 to col. 5, line 19.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the incorporate the additive of Gallucci '474 into the nylon fibers of Kahlbaugh et al. '399 to improve the dimensionally stability of the fibers and to reduce the water absorption by the fibers, as suggested by Gallucci '474 in col. 1, line 29 to col. 2, line 41.

Since the prior art range is seen as overlapping the claimed range of the molecular weight being about 500 to 3000, a prima facie case of obviousness exists which must be overcome through a showing of unobvious or unexpected results.

With regard to claims 45, 46, 78, and 79, Gallucci '474 teaches the additive comprising an oligomer comprising tertiary butyl phenol and having the claimed



structure in col. 1, line 49 to col. 5, line 10. Gallucci '474 is seen as disclosing the claimed structure when R is a tertiary butyl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 47, 48, 80, and 81, Gallucci '474 teaches the additive comprising an oligomer comprising bis-phenol A and having the claimed structure in col. 1, line 49 to col. 5, line 10 and col. 7, lines 28-35. Gallucci '474 is seen as disclosing the claimed structure when R is a alkyl hydroxy aryl group, R' is a direct carbon to carbon bond, and s equals 1.

With regard to claims 49, 50, 82, and 83, Gallucci '474 teaches the additive comprising an oligomer comprising dihydroxy biphenyl and having the claimed structure in col. 1, line 49 to col. 5, line 10. Gallucci '474 is seen as disclosing the claimed structure when R is a hydroxy aryl group, R' is a direct carbon to carbon bond, and s equals 1.

47. Claims 12, 13, 43, 44, 76, and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over the public use and sale of the invention and Gallucci '474, as applied to claims 11, 42, and 75 above, and further in view of Ueda et al. '055

With regard to claims 12, 43, and 76, the P19-1280 and P19-1281 filters and Gallucci '474 do not disclose the copolymer and the second polymer being heat treated.

Ueda et al. '055 discloses heat treating nylon fibers in col. 1, lines 23-26.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the heat treatment of Ueda et al. '055 into the fibers of P19-1280 and P19-1281 and Gallucci '474 to stabilize the fibers against heat and stress, as suggested by Ueda et al. in col. 1, lines 23-26.

With regard to claims 13, 44, and 77, Ueda et al. discloses heat treating the nylon to a temperature ( $180^{\circ}\text{C}$ ) less than the lower melting point of the polymers in col. 2, lines 37-51.

48. Claims 20-22, 51-53, and 84-86 are rejected under 35 U.S.C. 103(a) as being unpatentable over the public use and sale of the invention and Gallucci '474, as applied to claims 1, 33, and 67 above and further in view of Jariwala et al.

The P19-1280 and P19-1281 filters and Gallucci '474 do not disclose the additive comprising a blend of the resinous additive and a fluoropolymer.

Jariwala et al. discloses adding a nonionic fluorocarbon surfactant to a polymeric fiber in col. 1, line 4 to col. 4, line 64 and col. 11, line 39 to col. 12, line 27.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the fluoropolymer of Jariwala et al. into the fiber of the P19-1280 and P19-1281 filters and Gallucci '474 to provide oil and water repellency to the fibers, as suggested by Jariwala et al. in col. 12, lines 7-27.

49. Claims 64, 65, 97, and 98 are rejected under 35 U.S.C. 103(a) as being unpatentable over the public use and sale of the invention and Gallucci '474, as applied to claims 33 and 67 above and further in view of Raether.

With regard to claims 64 and 97, the P19-1280 and P19-1281 filters and Gallucci '474 do not disclose the step of directing air into an air intake of a gas turbine system having at least one filter element including directing air into an air intake of a gas turbine system having a plurality of filter element pairs, each of the filter element pairs including a first tubular filter element with the media pack sealed against an end of a second tubular filter element with the media pack, each of the first and second tubular filter elements defining the clean air plenum.

Raether discloses a similar method including the step of directing air into an air intake of a gas turbine system having at least one filter element (32) including directing air into an air intake of a gas turbine system having a plurality of filter element pairs, each of the filter element pairs including a first tubular filter element (32) with a media pack sealed against an end of a second tubular filter element (32) with a media pack, each of the first and second tubular filter elements defining a clean air plenum in Fig. 2 and col. 4, line 1 to col. 5, line 47.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the filter element pairs of Raether into the P19-1280 and P19-1281 filters and Gallucci '474 to provide a filter system having a number of

shorter filter elements to allow the shorter filter elements to be individually replaced when damaged to reduce maintenance costs.

With regard to claims 65 and 98, Raether discloses the step of directing air into an air intake of a gas turbine system having a plurality of filter element pairs including directing air into the first tubular filter element and the second tubular filter element, wherein the first and second tubular filter elements are cylindrical in Fig. 2 and col. 4, line 1 to col. 5, line 47.

The P19-1280 and P19-1281 filters, Gallucci '474, and Raether do not disclose the first tubular filter element being cylindrical and the second tubular filter element being conical.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to change the shape of the second tubular filter element of Raether in that such is merely a choice of design. See *In re Dailey et al.*, 149 USPQ 47.

### ***Conclusion***

50. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Barris et al. and Roth references disclose similar filter systems.

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51. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Greene whose telephone number is (703) 308-6240. The examiner can normally be reached on Tuesday - Friday (7:00 AM to 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Simmons can be reached on (703) 308-1972. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jason M. Greene  
Examiner  
Art Unit 1724



David A. Simmons  
Supervisory Patent Examiner  
Technology Center 1700

jmg  
January 30, 2003